

Factors affecting operative time during ureteroscopy and stone treatment and its effect on outcomes: retrospective results over 6.5 years

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Abstract

Background: We aimed to evaluate operative time with the outcomes of ureteroscopy (URS) and investigate the relationship between these factors, and assess if longer operative times were associated with a higher risk of complications.

Methods: We retrospectively audited consecutive cases of URS done between March 2012 and June 2018. Data were collected for operative times, patient demographics, stone parameters, stent insertions, use of ureteric access sheath, length of stay, stone-free rate (SFR) and complications. Statistical analysis was performed using IBM SPSS version 24.

Results: Over 6.5 years, 736 patients with a male:female ratio of 1.8:1 and a mean age of 54.7 years (range: 2–91 years), underwent 860 URS and stone treatment procedures. The mean operative time was 43.5 min (range: 8–160 min), with a stone size of 12.3 mm (range: 3–100 mm) and access sheath was used in 35.8%. The initial and final SFR was 86% and 92.5%, respectively, and 85.6% ($n=736$) patients were discharged the same day of procedure. Treatment of multiple renal stones, ureteric and renal stones, large stones, use of access sheath and post-operative stent were all associated with longer operative times ($p<0.001$). Patients who were stone free and those having day-case procedures had shorter operative times ($p<0.001$). There were 27 (3.2%) Clavien I/II complications and 8 (0.9%) Clavien \geq III complications. Clavien score \geq III ($p=0.028$) and infectious complications ($p<0.001$) had significantly longer operative times.

Conclusion: Patients with shorter operative times have a higher chance of being discharged home the same day without a post-operative stent. Higher operative times are associated with high-grade, especially infection-related, complications.

Keywords: complications, operative time, stone, ureteroscopy, urolithiasis

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Introduction

Ureteroscopy (URS), with semi-rigid and flexible scopes, has revolutionised the management of ureteric and renal stones. With the development of high-powered lasers, new techniques have been established for stone fragmentation such as dusting and pop-dusting, allowing larger stones to be treated more efficiently.¹ The use of ureteric access sheaths (UAS) also improves stone-free

rates (SFRs), as it facilitates clearer views in the kidney with low intrarenal pressure and allows repeated re-entry to the kidney to clear fragments in a time-effective manner, in addition to decreasing the infectious complications.²

Given the rising prevalence of stone disease, the number of URS procedures performed has increased by 252% over the past 2 decades.³ This

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has consequently led to an increased workload for endourologists. It has been shown that in centres with a higher workload, URS has shorter operative times, improved SFRs and lower complication rates.⁴ There seems to be a lack of consensus in urology that supports the correlation of shorter operative times of URS with improved patient outcomes. A recent general surgical study from the USA found that patients undergoing longer elective laparoscopic procedures had significantly higher complication rates, even after adjusting for patient factors.⁵ Similarly, a recent orthopaedic study⁶ analysed the complication rates for total joint replacement, and demonstrated that operative times greater than 120 min were associated with increased wound complications; whereas shorter operative times (less than 60 min) had significantly lower wound complication rates. Percutaneous nephrolithotomy (PCNL) which required longer operative times have already been directly correlated to increased adverse outcomes,⁷ which increased linearly with every additional 60-min increase in operative duration. Similarly, there are studies which show a higher risk of complications with longer procedural time with URS.^{8,9}

We wanted to establish whether similar findings would also apply to ureteroscopic stone surgery specifically, and therefore we set out to analyse consecutive cases of URS at a high-volume tertiary centre, with an experienced endourologist. Our aim was to evaluate operative time with the outcomes of URS, including its complications and SFR, and investigate the relationship between these factors.

Methods

Data collection

We interrogated the database of consecutive URS procedures at our institution (March 2012–June 2018) *via* retrospective analysis. Informed consent for participation in endourology research was obtained from all patients during their URS procedure. The audit was registered with our ‘Clinical Effectiveness and Audit’ office. Extracted data included operative times, patient demographics, stone parameters (size, number, location and multiplicity), pre- and post-operative stent insertions, use of UAS, length of stay, SFR and its complications. All URS procedures done for the treatment of stones in patients of all age groups were included, and URS for diagnostic or upper-tract tumour treatments were excluded.

Pre-operative assessment

Stone diagnosis was confirmed using a non-contrast computed tomography (CT) scan kidney–ureter–bladder (CT KUB) for patients >16 years and ultrasound scan (USS) for patients ≤16 years. Patients underwent a protocol-based pre-assessment with routine blood tests, including renal function, urinalysis and urine culture. To optimise patients prior to the procedure, a dedicated uro-anaesthetist reviewed all identified high-risk patients. Patients with a positive urine culture were given appropriate sensitivity-based antibiotics, with a repeat urine culture arranged. If necessary, up-to-date renal tract imaging was also organised in consultation with the surgeon.

Ureteroscopic procedure

A standardised protocol-based procedure was carried out for all patients, and antibiotic prophylaxis was given during the induction of general anaesthesia.¹⁰ After the placement of a safety guidewire, a semi-rigid URS was carried out (4.5 or 6F ureteroscope) to the ureteric stone or as far proximally as safely achievable. For renal stones, if appropriate, a UAS (9.5F/11.5F or 12F/14F Cook Flexor sheath) was inserted over a second guidewire. A flexible ureteroscope (Storz FlexX2) was used for renal stones. Laser stone fragmentation was performed with a 20W or 100W Holmium YAG laser [Versa Pulse Holmium Powersuite 100W or 20W Lumenis (UK) Ltd., Elstree, UK] using a 272 μm laser fibre (Lumenis, Inc.) and/or basket extraction. The technique used was stone fragmentation, dusting or pop-dusting, and larger fragments were removed with a Cook NGage nitinol stone extractor (1.7F or 2.2F, Cook Medical, USA). A 6F ureteric stent was placed at the end of the procedure and removed subsequently. Unless clinically indicated, a routine post-operative urethral catheter was not placed, and patients were discharged home the same day.

Outcomes

Operative time duration (in minutes) was calculated from the insertion of cystoscope (scope insertion) to the removal of all devices after the completion of the procedure and bladder emptying (scope removal). Stone size was calculated by measuring the maximum stone diameter on CT scan or for multiple stones, a sum of maximal dimensions of each stone. Day-case discharges were defined as patients discharged on

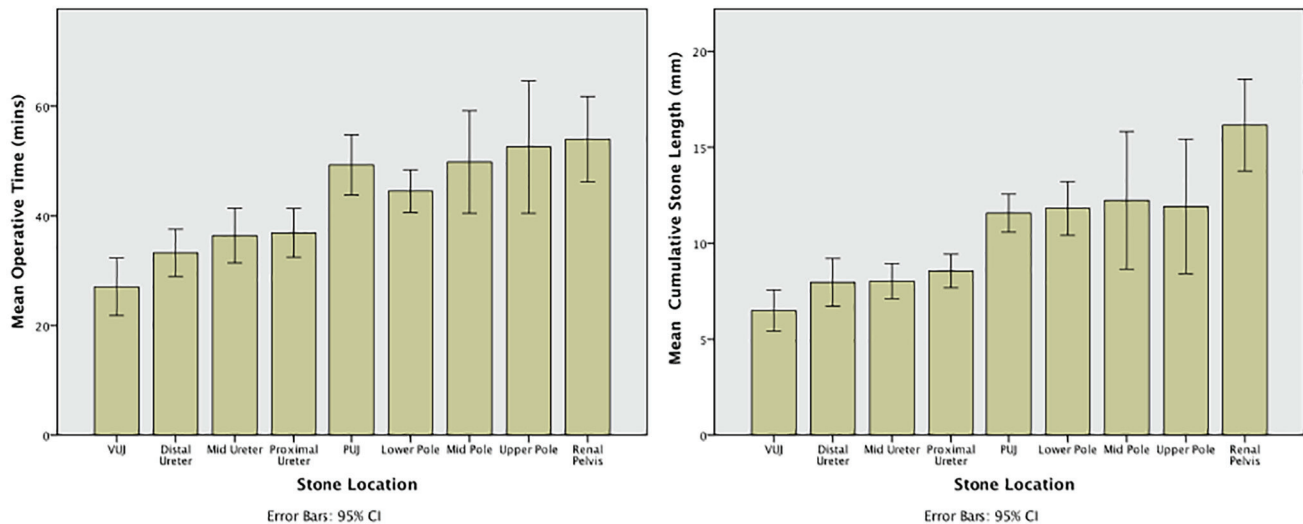


Figure 1. Operative times correlated with stone location and cumulative stone length. CI, confidence interval; PUJ, pelvi-ureteric junction; VUJ, vesico-ureteric junction.

the same day as having undergone the procedure. We classified patient complications using the Clavien–Dindo scoring system.¹¹ All patients with radio-opaque stones underwent plain X-ray (XR) KUB and those with radiolucent stone underwent a USS to establish an SFR. In selected cases, if there was a concern regarding residual fragments on a USS where the findings were contradictory to the endoscopic findings; or if the scan was equivocal, a CT KUB was performed. The SFR was defined as complete clearance of the stone endoscopically and clinically insignificant fragments (≤ 2 mm) on post-operative imaging done 2–4 months in our dedicated kidney-stone clinic. Patients who were endoscopically and/or radiologically stone free at the end of the URS procedure (as recorded on electronic theatre notes) and were symptom free at stent removal with no re-admissions but did not attend follow-up were presumed to be stone free.

Statistical analysis

Data were recorded on a Microsoft Excel spreadsheet and statistical analysis was performed using IBM SPSS version 24. Analysis was undertaken with simple and multiple linear regression. Statistics are presented with 95% confidence interval, standardised beta coefficient, and *p* value. Adjustments were made for all variables, and a *p* value < 0.05 was considered statistically significant.

Results

Over the study period of 6.5 years, 736 consecutive patients with a male:female ratio of 1.8:1 and a mean age of 54.7 years (range: 2–91 years), underwent 860 URS and stone treatment. Of these, 632, 84 and 20 patients underwent one, two and three procedures, respectively (1.16 procedure/patient). The mean operative time was 43.5 min (range: 8–160 min), and UAS were used in 35.8% ($n = 308$) of cases. The mean single and cumulative stone size were 9.1 mm (3–40 mm) and 12.3 mm (range: 3–100 mm), wherein 30.8% ($n = 265$) of patients had multiple stones, 11.7% ($n = 101$) had simultaneous renal and ureteric stone treatment. Mean operative times with stone location and cumulative stone length is displayed in Figure 1. The mean operative times were higher for larger stones and for renal stones compared with ureteric stones. The initial and final SFR was 86% and 92.5%, respectively, and 85.6% ($n = 736$) patients were discharged the same day of procedure. Each of the parameters correlated with their differing operative times are shown in Table 1.

Multivariate linear regression

The results of the linear regression, including the standardised beta coefficient and *p* values for all variables are displayed in Table 1. Access-sheath use was associated with significantly increased operative time in minutes (37.2 ± 22.33 versus 55.09 ± 26.33 ; standardised beta 0.239, $p < 0.001$). Patients with simultaneous renal and ureteric

Table 1. Correlation of operative times with outcomes.

860 procedures (736 patients)	Yes (n, %)	Operative time (min)	No (n, %)	Operative time (min)	Standardised beta coefficient	p value
Pre-op stent	281 (32.7%)	44.86 ± 24.81	579 (67.3%)	43.28 ± 24.81	0.04	0.28
Simultaneous renal and ureteric stones	101 (11.7%)	50.80 ± 31.81	759 (88.3%)	43.50 ± 24.20	0.15	<0.001
Stone multiplicity	265 (30.8%)	51.64 ± 27.94	595 (69.2%)	40.26 ± 22.88	0.08	0.06
Access sheath use (unavailable, n=38)	308 (35.8%)	55.09 ± 26.33	514 (59.8%)	37.2 ± 22.33	0.239	<0.001
Stone free	681 (92.5%)	42.09 ± 24.30	55 (7.5%)	64.77 ± 28.60	-0.18	<0.001
Post-op stent (unavailable, n=17)	688 (81.6%)	45.6 ± 25.1	155 (18.4%)	34.8 ± 24.9	0.18	<0.001
Day case	736 (85.6%)	42.04 ± 24.12	124 (14.4%)	53.81 ± 29.95	0.15	<0.001
Complications	37 (4.3%)	55.86 ± 33.47	823 (95.7%)	43.48 ± 24.91	0.05	0.11
Clavien I-II					0.058	0.08
Clavien ≥III					0.069	0.03
Infectious complications					0.065	0.05
Non-infectious complications					0.006	0.85

stones were also shown to have significantly longer procedures (50.80 ± 31.81 versus 43.50 ± 24.20 ; standardised beta 0.15, $p < 0.001$). Larger stones were found in the proximal ureter, pelvi-ureteric junction or kidney, and these required consequently longer operative times, which is also supported by the findings in Table 2. Patients who were stented at the end of the procedure had longer operative times (45.6 ± 25.1 versus 34.8 ± 24.9 ; standardised beta 0.18, p value < 0.001). Stone-free procedures were the only parameter associated with significantly decreased operative times (42.09 ± 24.30 versus 64.77 ± 28.60 ; standardised beta -0.18 , $p < 0.001$). Complication rates were not associated with longer operative times in general, but when split into the Clavien–Dindo classifications, we found that patients with Clavien score \geq III did have significantly longer operative times (standardised beta 0.069, $p = 0.028$). Similarly, patients with infectious complications were found to have significantly longer operative

times (standardised beta 0.065, $p < 0.001$). Patients who required hospital admission after their procedure had longer operative times than those patients done as a day-case procedure (42.04 ± 24.12 versus 53.81 ± 29.95 ; standardised beta 0.15, $p < 0.001$). Age, family history and sex were not significantly associated with operative times.

Complications

The full list of complications can be seen in Table 3. There were 35 (4.1%) complications (26 were Clavien I/II, 1 Clavien III and 7 Clavien IV complications) with no deaths in our series. The mean operative time and range are also shown in this table. These complications were stent symptoms ($n = 8$), urinary tract infection ($n = 7$), urosepsis ($n = 14$) and others ($n = 6$; Table 3). Clavien \geq III complications and infection-related complications had significantly longer operative time duration.

Table 2. Correlation of stone size and outcomes with operative times.

Location	Mean operative time, min \pm SD (if no SD, $n = 1$)				
	<5 mm	6–10 mm	11–15 mm	16–20 mm	>20 mm
VUJ	22 \pm 13	27 \pm 16	35 \pm 18	27	–
Distal ureter	24 \pm 13	35 \pm 20	43 \pm 22	40 \pm 13	86
Mid ureter	30 \pm 15	35 \pm 18	50 \pm 26	27	57
Proximal ureter	37 \pm 19	34 \pm 14	47 \pm 40	39 \pm 13	85
PUJ	25 \pm 17	39 \pm 17	52 \pm 21	70 \pm 22	97 \pm 8
Renal pelvis	30 \pm 13	37 \pm 21	61 \pm 30	61 \pm 17	61 \pm 16
Lower pole	26 \pm 12	39 \pm 17	43 \pm 12	62 \pm 30	69 \pm 23
Mid pole	32 \pm 10	42 \pm 25	49 \pm 23	72 \pm 27	91 \pm 39
Upper pole	27 \pm 16	43 \pm 28	46 \pm 15	74 \pm 22	65 \pm 7

PUJ, pelvi-ureteric junction; SD, standard deviation; VUJ, vesico-ureteric junction.

Table 3. Correlation of complications with outcomes.

Complications ($n = 35$)	Number of patients	Clavien–Dindo score	Mean operative duration (min)
Stent symptoms	8	I	45.0 (16–76)
Clot colic (unstented)	1		16.0
Urinary tract infection	7	II	74.0 (38–112)
Urosepsis	8		63.0 (19–132)
Aspiration pneumonia	1		55.0
Haematuria requiring irrigation	2		36.5 (35–38)
Urosepsis and stent migration	1	IIIa	29.0
Urosepsis requiring ITU admission	5	IVa	77.8 (19–132)
Respiratory complication (requiring ITU admission)	2		53.5 (49–58)

ITU, intensive therapy unit.

Discussion

Meaning of the study

Our results of a consecutive 860 procedures over 6.5 years show excellent SFR with low risk of complication rates. While there were no intra-operative complications, there were only 27 (3.2%) Clavien I/II complications and 8 (0.9%) Clavien \geq III complications. Figure 1

shows that the operative times correlated with stone location and cumulative stone length. Treatment of multiple renal stones, ureteric and renal stones, large stones, use of access sheath were all associated with longer operative times. While there was no difference in the operative time with the use of pre-operative stents, patients without post-operative stents and those done as a day-case procedure had

significantly lower operative times. Operative time was also associated with higher Clavien-grade complications and those with infectious complications.

Implications of URS operative time from previously published literature

It is known that larger stones need longer procedural time for stone clearance, although it is difficult to ascertain the point at which they become too long, potentially risking complications^{12–22} (Table 4). A retrospective study¹⁴ from Japan analysed a database of over 12,000 URS patients, demonstrating that a cut-off time over 90 min significantly increased rates of adverse events, mortality and ITU admissions. Higher stone burden and the location of the stone have an impact on the operation time, which was also demonstrated by Deters *et al.*¹⁵ They retrospectively analysed 213 patients (54% ureteric, 46% renal) and found that renal stones required significantly longer operative times (112 *versus* 70, $p < 0.001$). Our data also support this, with longer times also seen in patients with simultaneous ureteric and renal stones.

UAS are beneficial in URS, as they allow repeated access to the kidney, lower intrarenal pressure and allow clear views.²⁴ UAS were used in 35.8% of our cases and associated with significantly increased operative times (55.1 min *versus* 37.2 min). This is in keeping with the findings of Sorokin *et al.* who found that UAS use was associated with an average increase of 13.5 min per procedure.²⁰ In the CROES global study, UAS had no impact on the SFR but was associated with fewer infectious complications.² This supports our conclusion that provided UAS use is safe, the benefits for effective stone clearance in high stone burden outweigh the risks of a slight increase in operative duration. Intuitively, patients with pre-operative stents should have lower operative times given that the ureter is already passively dilated and would accommodate a ureteroscope more readily.²⁵ Similarly, patients with narrow ureters are more likely to have successful URS after a period of time with a stent in place.²⁶ In a retrospective study, it was found that pre-operative stenting can decrease operative times for stones that are ≥ 1 cm;¹⁹ our analysis however showed no significant impact of pre-operative stenting on operative times. Our data did show that patients who were stented post-operatively had significantly longer operative times (45.6 *versus*

34.8 mins), which attributed to surgical decision making, as patients with longer procedures had larger and more proximally located stones.

A complication rate of 4.1% was found for our data, which compares favourably with the European Association of Urology, which quote overall complication rates for URS lithotripsy of 9–25%.^{25,26} Several severe complications can occur following URS, including sepsis, bleeding, perforation, ureteric strictures and avulsion.²² We found that increased operative duration was significantly associated with Clavien–Dindo \geq III and infectious complications. There are several articles which have analysed specific outcomes of infectious complications following URS. Fan *et al.*¹⁶ reported on 227 patients and found that the key risk factors for infectious complications were pre-operative pyuria ($p = 0.017$) and prolonged operative times ($p = 0.026$). They found that patients with an infectious complication had an operative time of 99.42 min (compared with their average of 75.2 min), which again supports that longer procedures are associated with increased adverse events. They recommended that antibiotics were given prior to URS in patients with proven pyuria. Ogzor *et al.*¹³ also reported on infectious complications in a cohort of 494 patients and noted that the rates were higher in patients with abnormal renal anatomy, older age and longer operative duration (65 min *versus* 48 min). They found that specifically infectious complications increased by 2.4-fold in procedures longer than an hour.

Strengths, limitations and areas for future research

The strength of this study is that it is a large data set over the last 6.5 years. This is unselected and includes paediatric patients, emergency admissions, complex patients and regional referrals, with no exclusions. However, we did not have complete details of the pelvi-calyceal anatomy and therefore could not specifically look at the effect of this on operative outcomes of lower pole stones. Similarly, we did not routinely measure the Hounsfield unit (HU) of stones and there was a lack of long-term follow-up data for this cohort. HU is known to be a good indicator of stone composition, and a few authors have previously attempted to find some correlation between operative times and hardness of the stone.²³ Ito *et al.* in their retrospective analysis of 233 patients

Table 4. Literature review of operative times with outcomes.

Authors	Number of patients	Study type	Operative time (min)	Stone size	Multiplicity	Stone location (% ureteric, renal, mixed)	Access sheath	Complications	Recommendations for operative times
Pietropaolo <i>et al.</i> ¹	860	Prospective	Mean 43.5	12.3mm	30.8%		35.8%	4.1% (35) See Table 3	UAS are safe, and beneficial for effective stone clearance, though associated with longer operative times Increased operative times are significantly associated with higher Clavien grade and infectious complications
Knipper <i>et al.</i> ¹²	2010	Retrospective	Median 35	7 mm	Median of single stone	-	-	14.3% (298) Bleeding, ureteral perforation, extravasation, mucosal injury, ureteric avulsion, UTI, hydronephrosis and sepsis	Operative time significantly higher in patients who had a complication Significant difference with larger stone size, and stone-free rate in patient with complications
Ogzor <i>et al.</i> ¹³	494	Prospective	Mean 65.3 (infectious group)* versus 47.8 (non-infectious)	182.4 mm ³ and 161.3 mm ³	30.4%	19.6%, 50%, 30.4%	-	3.2% (16) Haemorrhage, thermal injury, perforation	Operative times >60 min increased complication rates by 2.36-fold (exclusions: patients with bleeding diathesis, neurogenic bladder, ureteric stone, immunosuppressed, pregnancy, digital URS, presence of nephrostomy or positive urine culture)
Sugihara <i>et al.</i> ¹⁴	12372	Retrospective						2.39% (296)	
Deters <i>et al.</i> ¹⁵	213	Retrospective	Mean 115 (renal) versus 98 (ureteric)	11.3mm (renal) 7.7mm (ureteric)	Single stones only	54%, 46%, 0%	-	3.3% (7) Pain, retained stent, stent migration, ureteral stricture	Renal stones required significantly longer operative times Pre-operative stenting did not decrease operative times

(Continued)

Table 4. (Continued)

Authors	Number of patients	Study type	Operative time (min)	Stone size	Multiplicity	Stone location (% ureteric, renal, mixed)	Access sheath	Complications	Recommendations for operative times
Fan <i>et al.</i> ¹⁶	227	Retrospective	Mean 99.42 (infectious group)* versus 73.37 (non-infectious)	2.06cm versus 1.66cm	Not stated	-	-	8.37% (19) Fever and rigors, SIRS and sepsis	Patients with longer operative times than 90 min had higher infective complication rates
Galal <i>et al.</i> ¹⁷	135	Retrospective	Mean 40.9 (rigid URS) versus 48.4 (flexible URS)	13.5mm versus 12.9mm	Not stated	100% ureteric	-	24.4% (33) Haematuria, renal colic, fever, UTI and ureteric perforation	Operative times were statically proven to be shorter with rigid URS
Ito <i>et al.</i> ²³	233	Retrospective	Mean 74.0	425 mm ³ (op time <90 mins) versus 934.6 mm ³ (>90 mins)	Not stated	-	95.7%	6.4% (15) High-grade fever, ureteric strictures requiring balloon dilatation	Longer operative times with stone volume, maximum Hounsfield units, absence of pre-stenting and the number of procedures carried out by the surgeon (prolonged if less experience)
Chu <i>et al.</i> ¹⁹	104	Retrospective	Mean in <1 cm: Presented 86 ± 9.2 Non-stented >1 cm 123.6 ± 59.8	1 cm (range 0.3–4 cm)	Not stated	78%, 22%, 0%	-	1% (1) Pyelonephritis	Pre-stenting allows shorter operating times as the ureter is passively dilated, allowing for larger access sheaths to be used
Sorokin <i>et al.</i> ²⁰	118	Retrospective	Mean 50.1 (±25.9 SD)	10.2cm (±4.4 SD)	Not stated	100% renal	41%	Not stated	Stone volume had the strongest impact on operative time, can be used to predict time by adding 2 min per 100 mm ³
Wolff <i>et al.</i> ²¹	307	Prospective	Median 35 [23–55]	6 mm [4–8]	22.1%	61.6%, 38.4%, 0%	-	10.8% (33)	No significant difference between experienced specialists and trainees performing URS with patient outcomes
Kuroda <i>et al.</i> ²²	472**	Retrospective	80.3 ± 33.7, 109.2 ± 34.4, 110.5 ± 23.0	651.6 ± 690.5, 1286.8 ± 1122.0, 3725.9 ± 4354.5	2.0 ± 1.8, 2.7 ± 1.9, 3.3 ± 2.5	R	100%	4.9% (23) Post-operative fever, ureteral stricture	

*Patients were split into two groups; those with infectious complications and those without.

**Patients were divided into stone-free groups: those with <4 mm fragments; and those with >4 mm fragments.

SD, standard deviation; SIRS, systemic inflammatory response syndrome; UAS, ureteric access sheaths; URS, ureteroscopy; UTI, urinary tract infection.

conclude that larger stone volume, low surgeon experience, high HU and lack of pre-operative stent were all associated with longer operative duration.²³ Conversely, Sorokin *et al.*²⁰ showed no predictive value of HU or stone composition, although stone volume was useful in determining the longer operative time. So, although HU was missing from our dataset, it is most likely of little clinical bearing. Complete information on patient comorbidities, stone composition and access sheath were also missing. The proportion of patients who had XR, USS or CT was not recorded, and the SFR was defined as fragments ≤ 2 mm, as opposed to totally stone free.

Although current clinical guidelines have no operative time limit, it is clear that longer operative duration is associated with higher risk of complications, especially those related to urinary infections and urosepsis. This duration is not defined, but studies suggest that perhaps the upper limit should be 60–90 min beyond which a staged URS procedure or a different treatment modality should be approached.^{13,16,18} Clearly, this would need to take into consideration pre-operative optimisation, urine culture, antibiotic prophylaxis for the procedure, intrarenal pressure and surgical expertise, all of which have been shown to affect complication rates. Perhaps there is a need for urology guidelines to address this issue to help clinicians on the ‘safe maximum operative time duration’ and a principle similar to the ‘as low as reasonably achievable’ in terms of keeping this procedural time to a minimum required for the job. Future studies would also need to look at the new thulium fibre laser which is meant to be two to fourfold faster than the current holmium laser.²⁷ Therefore, adoption of this new technology could potentially lower procedural times, possibly further decreasing complication rates.

Conclusion

Our study shows that operative times are longer while treating large, multiple stones, especially with the use of UAS. Patients with shorter operative times have a higher chance of being discharged home the same day without a post-operative stent. Longer operative times are associated with high-grade, especially infection-related, complications. These factors must be kept in mind for surgical planning while making decisions, and patient counselling, especially where multiple treatment options might apply.

Conflict of interest statement

The authors declare that there is no conflict of interest.

Ethical statement

The study was approved by our ‘Clinical Effectiveness and Audit office’ with written patient consent for participation taken prior to the procedure. There were no other ethical concerns from the study.

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